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SOME MEDICAL ASPECTS OF THE EAST AFRICAN CAMPAIGN)
(1916-1918)

By

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The magnitude of this problem is best illustrated by a quotation from the report of the Commander in Chief in India. He writes;.....
.....disease has throughout taken a heavier toll than enemy bullets. Although the strength of the Indian Contingent never reached fifteen thousand and casualties in action have been few, over three times that number were sent from India during the course of the campaign.

Casualties were comparatively few but when they occurred the most trivial injuries were fraught with great danger to the patient and for the reason that the columns were so far from the rail head and the base hospitals, where the only adequate equipment and attention was available that it usually took several days for the wounded to reach these hospitals.

The theatre of war was in 1914-15 British East Africa. By 1918 the operations were being conducted near /.



near the Zambesi many hundred miles south. In the interval fighting had occurred all over German East Africa in places so widely apart as Lake Tanganyka and the costal area of the Rufigi, in Myasaland and round the mountain of Kilia-m-njaro. This entailed an almost continual redistribution of all available medical units and medical transport. It was impossible to lay down establish and perfect any one line of communication along which evacuation of sick and wounded could be conducted. Make shifts became the order of the day.

A territory so wide as this has of course a great variety of climate and temperature. In the highlands of both British & German East Africa there is a climate which compares favourably with any we are accustomed to in this country. Extremes of heat are unknown. The nights can be quite cold. Vegetation is profuse. On the other hand around Lindi Port Amelia and the other coastal towns there is a hot swampy mosquito infested area especially trying to Europeans living under war conditions.

In these low lying swampy area prophylaxis was of the utmost importance. And the first place in prophylaxis is held by the mosquito net. It is essential that every man should have and that he should keep in good repair a net of the square pattern./

pattern. The triangular net sometimes seen is dangerous because during sleep the skin surface comes to be against the net and comes within reach of the mosquito..

The second important prophylactic measure is a daily dose of quinine. I am firmly of the opinion that if Europeans would commence this prophylactic dose of quinine a day or two before arriving in the country greater benefit would result than is at present being obtained. Too often during the first few days is it omitted and infection is an established fact before the precaution is taken. The dose to be taken is still a subject of dispute, some advocate grs V some grs X. My personal experience has been that gr V does not appear to be sufficient to ward off attacks of Malaria in an individual where the infection is well established and who is exposed to further infection. gr X on the other hand does lengthen the periods between the attacks of fever and certainly renders the attack itself less severe. Also I was informed by medical men who had worked for many years in the Congo that since the general use of a gr X daily dose of quinine among the missionaries traders and civil servants not only had the prevalence of Malaria diminished but black water fever was becoming comparatively rare among Europeans/

:peans .

A Third precaution is that after 5.p.m. daily troops should not be allowed to wear shorts. And when slacks are worn the ankles should be guarded against the mosquito. The mosquito boot of the country made of soft leather and worn up to the knee like a field boot is an excellent safe guard. It can also be worn with comfort by nurses.

We have still left the face and hands unguarded between 5.p.m. and bedtime. Citronella and other volatile oils have been suggested. A saturated solution of Sulphate of Magnesia sponged on the face and allowed to dry is believe by some to deter the mosquito. My own opinion is that mosquito-oils are quite useless. I have watched a mosquito settle down to work on a surface so guarded. The best thing and the only thing to do is to kill the insects as they attack one. The buss of a mosquito is so intensely irritating that I have never seen a European so apathetic as to allow himself to be attacked without protecting himself. If a man should reach this condition it is high time he was sent out of the tropics, otherwise he will develop neurasthenia.

These precautions can and ought to be taken in base camps and hospitals but troops on the march cannot always carry mosquito nets. They can however use/

use mosquito oils if these are believed in and they can carry quinine.

The best hour for taking quinine is about six o'clock, and it was our custom to issue rum and quinine at the same time. I found that the daily issue of rum had a beneficial effect on the health and what was equally important in a country of appalling monotony, on the spirits of my men.

The rainy season in East Africa occurs from February to about the middle of May. Its outset can be anticipated with tolerable accuracy and its cessation can be counted on for about a certain date (e.g. 12th May in Tabora) the outset and cessation varying somewhat in different parts. During the Campaign the outset of the rains meant a temporary cessation of hostilities, and an increase of sickness. The first rainy season the men of my own unit stood well the second soon searched out the weakling the third produced an impression of misery and despondency, almost of melancholia in a fine body of men debilitated by continued hardships and discomfort and suffering from a lack of mental stimulation and relaxation. I do not think European troops should be kept in the climate of East Africa for a period of longer than 30 months at a time especially under war conditions. It is especially important also that efforts be made to provide recreations and to develop the social life of camps in a coun-

:country where literature is scarce or unobtainable and where letters and news of the outside world only penetrated at long intervals. The depressing influence of the climate ultimately brought most men to a condition of health ripe for the fatal invasion of the many diseases of the country.

The rainy season also meant that the roads became impossible for any but porter transport. I have seen a narrow river flood to 9 miles. Supplies to the hospitals and troops up forward could only be maintained with extreme difficulty. Shortage occurred and this at a time when good food was doubly necessary, and when hospitals had the greatest need of comforts.

The distribution of medical units was something after this manner; though the many phases of the Campaign which necessitated the continual changing of our base ports makes it outside the scope of this article to describe any one of our many lines of communication in detail. At the port there was the base hospital elaborately equipped e.g. at Dar es Salaam, Nairobi, Port Amelia &c. These hospitals were all far too far back to be of any real value to the troops in the field. Here we had our pathologists and microscopes. The patients eventually reached these aids to diagnosis but often not until they were en route to Europe. It will surprise some/

some people to hear that one hospital of 400 beds had no microscope during the first year of working in East Africa. Elaborate pathological tests were unheard of. I consider it is essential that every medical officer should be provided with a portable microscope and stains even when working with a column in East Africa. Without them accurate diagnosis is impossible in a country where ~~sp~~^{fe} ~~erallum~~^{ver}, Malaria trypanosomiasis are among the commonest possibilities. The Belgian medical officers were provided with such an equipment and were able to render their troops much better service than were we whose sole equipment consisted at times of a thermometer and a bottle of quinine. Portable laboratories preferably in the form of equipped motor vehicles are desirable and should be kept as ^{far} forward as is compatible with safety and good work. To require to send a man several hundred miles to have his blood examined is obviously absurd and was naturally not done unless his condition warranted a trip to a base hospital.

From the base to the column was a road which had been made as the column advanced. Along this were scattered rest posts maintained chiefly as stages in the forwarding of supplies and the evacuation of sick. The position of such posts was not always what one might desire. The site was frequently hurriedly selected, the factors influencing the selection being the proximity of water and the distance/

:tance from the last post.

Water was often a difficult problem. There was never to my knowledge any actual scarcity such as was experienced in Palestine or Sulva. Occasionally in the plains one passed through a dry belt 30 to 40 miles wide but even here water could be reached by boring. It was usually the quantity that had to be complained of. Where we were in mountainous country the supply was abundant and clear. However it contained a small quantity of mica and other salts at places and a mild form of diarrhoea resulted from drinking certain waters. The natives of the country do not like clear water for drinking purposes and prefer cloudy water probably on account of this tendency. In the vicinity of villages precautions had to be taken against disease being conveyed by the pollution of the water supply. Dysentery had chiefly to be guarded against. Belharzia was of course also a possibility though I never met a case contracted in the country. The precautions carried out were chiefly chlorination or boiling the latter being the more popular and more frequently used. To be compelled to use chlorinated water^{is} disgusting to all concerned and men are apt to fetch their drinking water from other sources if they can manage it without detection.

Post/hospitals were extremely easy of construction /

struction . With bamboos and grass excellent housing can be constructed. The floors were made of ant heaps beaten flat while still wet. Beds can be made by ^{be} hurrying four upright sticks with forked ends, the side pieces being made of three bamboos tied together and the mattress of cross pieces of split bamboo placed close together. This is covered with grass well dried and covered with a ground sheet. It is nearly always possible to obtain material for such structures and with native labour they are easily and rapidly constructed and steps should be taken to house Europeans in this ways where no better accommodation is available whether they are in hospital or not. Too little attention was paid to this detail and it was I think responsible for a certain amount of sickness. With 50 native boys one can collect the material for and build in two days a hut big enough to accommodate 25-30 men. An important detail is to have the pitch of the roof at an angle of not more than 60° and to thatch with thoroughly dried grass. Trenches should be dug under the eaves and drainage arranged to secure the hospital compound against flooding on the sudden break of the rains. It is remarkable the rapidity with which flooding occurs. At Kelossa I remember one occasion rain starting at about 4 in the afternoon and my finding my personal belongings literally /

literally floating about the tent next morning. Once the ground gets thoroughly soaked there is little hope of it drying again before the end of the wet season. The place becomes converted to a quagmire and indescribable filth results. Good deep drains with a suitable drop must be provided and therefore a site with a good slope is desirable..

The duties of these post hospitals varied. Some were on a more elaborate scale than others and kept their patients till they were fit to return to duty. Others acted as merely as rest post for patients en route to the coast, and for relieving of their sick columns of carriers or troops going up to the line.

The evacuation of the sick and wounded from the firing line to the base was done by three means 1. By motor transport 2. By ox waggon transport 3. By porters. These three types vary greatly in their speed reliability sphere of operation and effect on the patients carried. Let us take them in turn.

First motor transport: A motor ambulance convoy was employed on each line of communication. It consisted of 50 or more ambulances and the personnel was made up of a mechanical staff and a medical staff of to begin with 4 medical officers and 20 men. Each convoy was subdivisible into 3 parts capable of working/

working independently of each other. A well equipped workshop was attached to maintain the vehicles in good running order. In 1916 when General Van Deventer made his rapid advance from the rail head to Kondo Irangi an old arab slave post 200 miles away the evacuation of the sick and wounded from his army was done entirely by motor and ox waggon transport and it was during this period that the problem we were called on to solve first presented itself. At Kondo the convoys used to receive their patients & were responsible for them till they safely handed them over at the rail head. The journey took 3 to 4 days during which time the patients had to be fed and treated.

In selecting a motor ambulance for use in tropical warfare one has to consider the question first from its mechanical standpoint and secondly from its medical aspect. Briefly the mechanical considerations are reliability, a small petrol consumption (a most important factor where one is far from ones petrol supply) capable of being used on the roughest of roads, a high clearance to avoid tree stumps and for fording rivers, easily driven so that drivers can easily be replaced and a car thoroughly standardised in order that spare parts are easily obtained and interchanged from one car of the unit to another. My convoy consisted of Ford cars, familiar to every one. This /

This car fulfils many of the conditions, enumerated above but it has its disadvantages. The body of a Ford Ambulance overhangs the back axle too far and on a rough or hilly road a swaying motion is imparted to the machine which makes it a bad machine for the transport of stretchers cases particularly fractures of the thigh unless special precautions are taken to so fix the patient in a frame as to make him free from the jolting of the ambulance. The light springs of this make of car are another point against it making the perfect ambulance. I have on several occasions had to convey a compound fracture of the thigh or other similar seriously wounded case two hundred miles in such a vehicle and I can assure my reader that such a proposition gives one the greatest anxiety. On one occasion taking the utmost precautions with the patient fixed in what practically amounted to a box splint, padded and rigid to fit his trunk and limbs, the journey working out at under 4 miles an hour, I managed to get the unfortunate man to the rail head. He died later however not of his wound but of the exhaustion entailed in the journey. I am of opinion that no fractures of the lower limb or spinal injuries or condition where added shock must be seriously prejudicial to the safety of the patient are suitable cases /

cases for evacuation by light motor ambulance. It is better however had the conditions obtaining in the forward field hospitals to keep such cases there until union has taken place rather than submit them to the very grave risks of a long and arduous journey by motor ambulance.

This of course suggest that a different distribution of available hospitals might have been better. The practice was to keep elaborately equipped hospitals at the coast and rail head and bring patients back to these by ambulance. Now the carrying capacity of an ambulance of the Ford type is 600-700 lbs or three patients two stretcher and one sitting up case. It always suggested itself to me that it would have been much better to have had our larger hospitals well forward in the vicinity of the fighting troops and to have used this lifting capacity to bring up hospital requirements and comforts. It would have been a great economy of transport and medical staff. It would have done away with the necessity of maintaining two sets of establishments one up forward and one at the base. The patients would not have had to submit to the horrors of a journey by light ambulance, a really trying ordeal, and the specialists departments would have been at hand to assist regimental medical officers and field ambulances in their work. A very small establishment at /

at the ports would then have been able to cope with those case which had to be sent out of the country. The want of bacteriologists^S was felt badly. The differentiation ^{between amoebic} ~~BETWEEN AMOEBIC~~ and bacillary dysentery ^{AND} WAS impossible, the routine examination of the blood of malaria blackwater and trypanosomiasis cases was not done.

The medical aspect of the selection of an ambulance for use in East Africa must be based on consideration of the climatic conditions of the country. The sun from 9.a.m. to 5.p.m. all the year round is to the European head and spine the most dangerous in the world. And on a cloudy day it is double dangerous to the ignorant because they are apt to be less careful than usual. I have seen several cases of sunstroke got when the sufferers thought he was in safety under a grass roof the sun having found its way through an unsuspected chink in the thatching. It is an excellent rule to insist on soldiers wearing helmits even when engaged in office work everywhere except in a stone built house. The corrugated iron roof so frequently seen in the tropics is itself not a sufficient protection. It may be rendered so by the addition of 18 inches to 2 feet of grass thatching. The first consideration in designing an ambulance then is to have it sun proof. The ordinary canvas body/

body work is quite useless as a protection against sun unless it is of good tent canvas and at least three thickness. An inner red lining like that used in spine pads would render it safer. Even thus I doubt if it is possible to make an ambulance sunproof. What is the alternative? A patient lying down cannot wear a pith helmet but it ought not to be difficult to devise some form of pith head gear which would protect the danger points when a man is lying down or asleep. A patient making a whole day journey in an ambulance soon becomes fatigued and in attempting to wriggle his body into a position of comfort the first thing he does is usually to discard his helmet.

Dust was another bug-bear of ambulance travelling. The primitive roads soon became inches deep in dust and added further to the discomfort of the sick. It does not seem possible to remedy this without shutting out at the same time every source of ventilation.

The feeding of patients during a journey did not present any great difficulty. It was our practice to have a cook two or three orderlies and a medical officer (I give them in their order of importance) with each convoy. Nothing elaborate was attempted in the way of catering. The diets were /

were divided into milk light and ordinary and the latter being the usual tinned meat and biscuit. Milk diet was equally simple to provide. The light diet was a little more difficult. We used to cook cereal pudding before starting and this with tinned chicken and rabbit was made to do.

In long journey of this kind the best arrangement is to send the ambulances on first and to have the medical officer with his equipment, the fitter with a repair car and the ration car in the rear. It is then possible for each of these individuals to attend to his duties as required. Thus when a man became ill his car stopped and waited the arrival of the medical officer. A speed of 8 miles an hour should not be exceeded when carrying cases of ordinary severity.

Ox waggons were used widely for the transport of sick and men convalescent from malaria and dysentery. The pattern was that used by farmers in South Africa --- a long four wheeled springless vehicle drawn by eight or ten pairs of oxen. These carts were used for the transport of provisions up to the line and used for the sick on the return journey. These carts have no hood to protect the passenger from the sun. In their progress the oxen raise thick clouds of dust. Flies are in all climates /

climates the inseparable companions of oxen and a form of tse-tse fly(not the morsitans)was abundant. In working oxen it is customary to give them two shifts a day the first from about 4.p.m. to 8.p.m. or thereby the second in the small hours of the morning. At other times they are outspanned and the route followed has to adapt itself strictly to the distribution of water. Taking into consideration the above factors it is small wonder that one condemns most strongly this means of evacuating sick and convalescent men. The hours during which such convoys travel are the very hours when such patients require sleep. Rest on the cart itself while in motion is quite out of the question. The shape of the vechicle itself-- narrow with sloping sides not unlike a punt on wheels is not adaptable to the comfort of the human body. Sleep during the day is fraught with danger owing to lack of shelter even if the cattle fly gave one any peace. The use of mosquito nets in the evening is not possible. These convoys only travel eight or ten miles in twenty four hours and used to take five or six days between post hospitals in which time the convalescent man became further debilitated and exhausted and in all probability got a further infection of malaria. For Dysentery patients it was still more trying. Regularity and care in their diet was impossible. I had convoys of this type under my charge at one period/

period looking after two at one time travelling one days journey apart which I kept in touch with my motor car. I formed the opinion that the patients suffered considerable in health as the result of their journey. The only thing that justified the use of ox waggon transport was the shortage of other means of disposing ^{OF THE SICK} ~~them~~.

The use of porters for carrying sick is the most ancient and in some ways still one of the best means of moving sick men. In East Africa the apparatus was simple² merely a pole with a hammock slung under it. Men complained bitterly at times of being moved in this way but it is the only feasible way of taking the sick and wounded when troops are on detached duty and in bush country uncharted and without road. Four porters per man carried is the ratio to be maintained. If you have less than this the porters will become foot sore and sick or desert. They work in two shifts and ought to carry a patient twelve or fourteen miles a day regardless of the type of country. This form of transport was merely used during the rains when the roads became impossible. It is suitable for the moving of malaria and dysentery patients though for fractures and seriously wounded men it is only to be thought of when nothing else /

else is available. The patients stand the journey well. It does not try them to the same extent as motor transport and is infinitely to be preferred to ox waggon transport. One point has to be watched the porters sometimes trot a gait not conducive to the patients comfort.

The troops employed in the East African Campaign were drawn from many parts of the world. There was a contingent from India; a large number came from South Africa and Rhodesia including British Dutch and Coloured troops; West African troops were employed; Chinese workmen were engaged in the workshops of Dar is Salaam; besides many thousand of African Natives from East Africa Uganda Somaliland Myasaland. Troops drawn from so many sources suffered not only from the diseases prevalent in their own various countries but also from those diseases ^{ENDEMIC.} indigenous to East Africa. The importation of new infections by new arrivals from another contingent had always to be borne in mind. The influenza epidemic which ravaged the whole world last year arrived thus in East Africa and took its toll. Plague was imported from India. The necessity for quarantine camps at the ports of arrival is an obvious necessity and the strictest medical examination of all troops arriving is of the utmost importance. these precautions were usually taken at the ports.

Quarantine presented one of the gravest difficulties which confronted the medical officers individually. To illustrate the problem which he had to decide let us consider the case of outbreaks of smallpox and outbreaks of cerebro-spinal fever. Both of these diseases are endemic in all parts of East Africa. In the later stages of the Campaign we were employing well over one hundred thousand porters recruited from all over the country from the Congo and the occupied territories and our British holdings in Uganda and elsewhere. These porters were mostly enlisted by press gang methods and some form of quarantine was attempted before they were put into general employment with the Army. So far so good. Then, these porters worked in huge gangs carrying their loads from the coast right up to the column a distance of perhaps 150 to 200 hundred miles passing through a series of posts en route. At these posts the sick were paraded and attended to. These parades had per force to take place at night. As the porters moved off again in the early morning. Suppose for example as frequently happened one was satisfied one had got two or three cases of cerebro-spinal-meningitis what was one to do? It was out of the question to attempt to quarantine any great number of these men for the maintenance of supplies to a force hung oftimes on a very slender line of communication and to attempt such isolation meant disaster. There was nothing for it but let the suspects /

pects go on and risk it. The same of smallpox. The only measures practicable under the circumstances were to arrange porters to work in small groups, in these larger assemblies under their own head men.. For To arrange for these sub-groups to feed alone. To have at your rest camps many small huts in preference to a few larger ones. And finally to have these gangs of porters working back and forward daily over a short section of road of say 10 miles and returning nightly to the same camp and by so doing keep one gang strictly isolated from the next. Then if a case of meningitis occurs it is possible to take steps to cope with it with some hope of success. And this distribution with a little management can quite well be done.

The diseases endemic to the country (I speak chiefly of German East Africa but the same applies to British & Portuguese territory) are manifold. Those which came chiefly under our ken and depleted our forces most were Malaria Dysentery Spirochillum Cerebro-spinal-meningitis and Smallpox. Plague was uncommon. Pneumonia was very frequent among African Natives who seem to be especially prone to respiratory illnesses.

Malaria topped the list by far as a cause of wastage in the force. Very few Europeans indeed have come through this Campaign without suffering to some extent from this malady. One always approaches the

the subject of Malaria with diffidence. So much has been written on it and we are so little further forward. I remember in my childhood having quinine administered to me exactly the same routine ^{being} carried out as one was in the habit of prescribing to ones patient here. The chief obstacle of the stamping out of this disease is the feeling that it is inevitable which pervades all classes. The negro says it is a "SHAURI A MUNGO(an affair of God)" and thats where the matter stands.

Active prophylactic measure however undoubtedly bring their reward. Panama & Zanzibar are monuments to the efficiency of drainage and anti mosquito propaganda. What can one do? First the site of a camp must be chosen with a view to drainage. The drainage must be such as to ensure rapid drying after heavy rain. The drains must be such that the flow of water in them is rapid and free from any obstruction where stagnation might occur. It has been recommended to oil running water but this appears unnecessary if the above mentioned features can be obtained. All standing water must be sprinkled with oil, or, if too extensive, have logs soaked for some days in oil floating near the banks. All vegetation should be cleared for 100 yds around dwelling. Old tin cans hoof prints in fact any recepticle which will hold a few drachms of water is a potential breeding place for mosquito. Camps should never be placed nearer than a mile to native /

native settlements and such settlements should be placed under the necessity of keeping their compounds free from mosquito breeding grounds. To merely cover water is not enough. It is an undoubted fact that mosquitos will breed even in a dark septic tank. Cisterns have to be borne in mind.

Antimosquito measures should be in the hands of a special department. It will well repay the ^{COST OVER} customer and over again. The ordinary medical officer with his many duties cannot give this problem the necessary attention. Skimped work here is useless. Thoroughness is the only key to success. The African colonisation in the past has been brought to naught by the mosquito. The developement of this huge and wealthy country will rapidly follow the footsteps of the pioneers who lead this crusade.

In all parts of East Africa at altitudes below 5000 feet Malaria of all varieties was met with. Both benign and subtertian types of infection were prevalent. ~~Once~~ a man was infected I do not think a cure was ever completed so long as the patient remained in the country. The mosquito was not found above 5000 feet in my experience. The same patients were admitted to hospital ten twenty and thirty times. All manner of treatment was tried. Statistics are not available and my conclusions are based on conversations /

tions with other medical officers and on my own experience.

The five ways in which quinine was tried were by mouth, per rectum, in intramuscular injections, subcutaneous injections, and intravenous injections. To consider the latter first. It is the manner par excellence for cases of cerebral malaria where the most rapid action is desired. In all cases of cerebral malaria the question of heat stroke must be thought of. Where a blood smear cannot be examined it is advisable to treat the case as one of malaria & inject a large dose of quinine in saline directly into the vein. IN this condition the intramuscular or any other ^{METHOD} is not to be relied on.

Quinine per rectum was widely used in some hospitals but appears to me ^{AN} unnecessarily elaborate method of exhibiting the drug. It presents no advantage as regards rapidity of absorption.

The intramuscular injection has long been a favourite. Where the ampoules were not provided, I prepared my injection by dissolving 125 grns of quinine binydrochloride in 200 cc of filtered water. This was evaporated on an improvised sand bath to 125 c.c. An injection of 1 c.c. is then approximately a 15 grain dose. A troublesome feature about the intramuscular injection of quinine is the amount of /

of pain and stiffness and the localised induration—distinct from the abscess due to want of sterilisation. This tendency is due I think to the hyperacidity of the solutions provided in ampoules and may be overcome by adding a minute quantity of dilute alkaline solution duly sterilised in quantities insufficient to precipitate the quinine from solution. With the injections of fluid I prepared for myself I had no cases of abscess or induration.

Malaria is so frequently accompanied by gastrointestinal disturbances that in a large number of cases ~~that~~ quinine by injection is the only feasible way of administration. The injections are given once daily and the amount injected ~~was~~ grs X to XV. During this time I gave no quinine by mouth. The injections were continued till the vomiting and gastric upset had passed off when quinine by mouth replaced the injections. The best sites of injection are the **buttock** and shoulder. In the buttock a point two inches behind the anterior superior spine and two inches below the crest is safe ^{for} quinine injections. The line of the sciatic nerve has to be kept in mind. It is apparently unnecessary to strike the nerve itself to produce disastrous and painful results. Injection in its close neighbourhood is quite sufficient. In making the deltoid injection the musculo spiral nerve has suffered. Keep well up in the vicinity of the acromion. The patient should massage the /

the area lightly three or four times a day.

The sub^{cu}cutaneous injection has no advantage over the intramuscular. If given in the mammary region it sometimes causes considerable pain in the course of the intercostal nerves..

Quinine by mouth is the best method of all. Here we have to consider the form in which the drug is to be used- powder tablet or liquid. Powder and tablets have one point at least to recommend them; They are easily carried on the person and therefore more likely to be used regularly. The old custom of taking the powder wrapped up in cigarette paper must be condemned. Dry quinine undoubtedly produces indigestion after a time. Tablets have been condemned as they are said not to be dissolved. This may be so with sugar coated tablets especially if old but with the ordinary compressed tablet if the patient cracks it with his teeth before swallowing it this objection cannot arise. The liquid quinine either a solution of the Bihydrochloride or the sulphate dissolved in an acid solution was the form most widely used both for prophylaxis or treatment. The only objections one has to it are its intensely disagreeable taste, and that if there is any tendency to gastric disturbance this method of administration is more likely to upset the patient than tablet form which is dissolved /

:solved slowly and absorbed less rapidly.

I prefer to use quinine by the mouth whenever practicable. Its action appears to be equally effective to any other method and almost as rapid as any method with the exception of intravenous injection. A few general rules are to be observed in its use in the treatment of Malaria. In an ordinary attack of Malaria particularly the subtertian variety one often finds the patient vomiting, and his conjunctiva faintly yellow, and that he is extremely constipated, in fact with all the symptoms of a mild catarrhal jaundice. It is therefore advisable to start the treatment with two or three grains of calomel followed by a saline. The vomiting is controlled usually with one minimum doses of Tr.Iod. given every 10 minutes for an hour. He should be given during the ague stage hot and during the pyrexial stage cold lemon juice ad.lib. Even if it induces vomiting I know from personal experience that nothing is so comforting. Hot bottles and blankets complete the first stage of the treatment. Many patients sleep soundly after the rigor is past and while the temperature is rising. This inclination for sleep together with a day or two of stubborn constipation, I have observed to be in a chronic malarial subject frequent prodromal symptoms of an attack. For a day or two prior to the attack one often has excellent nights, AND wakes in the morning feeling particularly fit. Towards evening /

evening ^{ONE} ~~they~~ feels restless and exhausted. During these two or three days quinine in quantities of grs XXX may ~~be~~ avert an attack. But to proceed: presume the patient has had his rigor and his temperature has risen to 104^o or 105^o. Beyond giving him lemonade do nothing. Practical experience has taught me to withhold quinine till he is perspiring freely and his temperature has fallen ~~to~~ several points. The thing to guard against is chill. Change his blankets (sheets are taboo) and his pyjamas, which must be of flannel, frequently. It is economy to wait till he stops perspiring but it is not good practice. What dose of quinine is to be given? I have seen as much as grs 70 a day advocated. My practice is by mouth gr X three times a day. By needle gr X once a day. Per rectum grs 50 a day. Intravenous in special cases gr XX in Saline. I have found these doses control any case of Malaria. These large doses (gr X. T.I.D.) should be continued for 10 days; reduced to twice a day for the next ten days and once a day thereafter. The diet should be milk during the attack. If there is no gastric disturbance a liberal diet of chicken, pudding, soup et. etc. can be given next day. This early return to diet is I think most important and accelerates convalescences. Attention to the bowels is next in importance only to quinine. Arsenic during convalescence is very useful.

A point in a recent article in the British Medical Journal by a medical officer is suggestive. He suggests the best time for the administration of quinine is in the early morning about 5.a.m. His aim is to anticipate sporulation and prevent it. This appears to be a most attractive modification of treatment especially where one daily injection of quinine is the routine.

Tartar emetic in the treatment of Malaria was first suggested by Rogers. It was tried in East Africa. I had no experience of it but apparently those who administered^{it} were not satisfied with results. Colonel Newham who was in East Africa later in his article in the British Medical Journal March 3 1917 describes a case, where the blood showed both rings and crescents, ^{WHERE} Tartar Emetic was administered intravenously in doses increasing from grs 1 - 2½. The leucocytes, rings, and crescents in a smear were counted. There was no reduction with Tartar Emetic but an immediate reduction when it was replaced by quinine. Salvarsan or similar preparations were used. They do not appear to be any better than quinine. I had no experience of them.

When one speaks on Malaria one feels on fairly firm ground but when one approaches the kindred subject of Blackwater Fever one is again in the midst of controversy. Is it related to Malaria or not.

not. I am inclined to think it is. One sees it mostly in people who have spent long periods in a malaria district and who are sufferers from chronic malaria. Is it brought on by abuse of quinine? I think not. I have already mentioned its diminution in the Congo since daily doses of quinine were used. Is quinine to be used in its treatment? My rule is this: If the blood show parasites to be present use quinine. If they are not present don't use quinine. I admit this is a compromise but it is as far as our knowledge permits us going. In six cases of blackwater under my care I gave intramuscular injections of perchloride of mercury. They appeared to benefit by it but as the means at my disposal were inadequate I had ~~meantime~~ to forego further treatment. *investigation.*

Dysentery was chiefly of the amoebic type if one consider its amenability to treatment by emetine as a differential test. Our routine method of treatment was Sulphate of Magnesia in one drachm doses every hour till the patient received eight doses a day. Emetine in either one dose of one grain or two doses of half a grain was also given. The diet consisted of nothing but an unlimited supply of cold boiled water not even milk. Such a strict regime is essential. Even milk keeps

up the intestinal disturbance. Continue the water diet until the patient ceases to pass any blood in the stools. A patient can be kept on this water diet for from eight to fourteen days safely. Tenesmus and colic are reduced. Morphine is a most useful drug in dysentery. I always administered it about 7 every evening. At this hour the patient is thoroughly tired by the days pain. It assures him the few hours relief and ^{THE} sleep he needs. I always left with the a patient a further small draught of chlorodyne to take if he awoke in the small hours of the morning. Sleep is a most important factor in the treatment of dysentery. I had no success with rectal irrigation using either normal saline or silver nitrate even in the late stages of the disease when the patient was passing only a small quantity of mucus.

Prophylaxis is of the utmost importance. To merely boil drinking water is insufficient. Any man who has had dysentery must be barred from employment in the cook-house and from the handling of supplies in any way. At least until a bacteriological examination of the stools proves him to be free from infection.

In all cook houses there must be water soap and nail brushes for the use of the cooks and thorough cleanliness is enjoined. In latrines there should be a bucket of antiseptic for general use. When natives are employed as cooks one must be doubly vigilant. The native considers any form of diarrhoea a trivial affair till it overcomes him completely. Incineration of refuse by burning diminishes flies and the incidence of dysentery decreases in proportion. In East Africa there is never any difficulty in obtaining fuel for incinerators.

Cerebrospinal meningitis is endemic to the country. Statistics were unobtainable but I have heard it authoratively stated that the Germans estimated the mortality from this cause at about 11000 a year. This figure must have been guesswork, but certainly ^{IT} must be enormous. At Tabora I had charge of a C. S. M. compound, and the porters quarantined for this disease. Our treatment was necessarily simple. Puncture and drainage and the administration of Urotrophine was all the means at our disposal. The mortality was between 40 and 50%. Serum for treatment was not at hand. In East Africa it is very necessary to have an unlimited supply of good reliable /

reliable serum . Here again our distance for laboratories was a great handicap.

Smallpox is another of the endemic diseases. Very few Europeans were infected. Recent Inoculation of all troops should be done.. Our success with the lymph supplied was not good. In vaccinating a negro it has to be borne in mind that he is a tough skinned human being and that some tribes delight in anointing themselves with earth. The skin has therefore to be very thoroughly scrubbed before attempting vaccination. Our lack of success was probably partly due to this and partly to the fact that a very great number of them have at some time a mild form of smallpox which ^{PROTECTS BUT} does not disfigure at all. It is these very mild cases which are so easily passed over in the black races and are the principal means of spreading the disease. Moreover the natives themselves do not treat smallpox as a serious matter.

I have attempted in this article to summarise the difficulties medical officers engaged in field transport work had continually to overcome. In the treatments I have enumerated I have merely stated the lines we ^{UN}formed best suited to our conditions /

to spend Fall soon.